

# SUBSTITUTE SPECIFICATION

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## MEDICINE BAG PRINTING APPARATUS

### TECHNICAL FIELD

[0001] The present invention relates to a medicine bag printing apparatus.

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### BACKGROUND ART

[0002] A patient receives a medicine bag containing medicines such as tablets and triturates prepared in accordance with a prescription. A medicine bag printing apparatus prints a name of a patient, a name of a medicine, guidance such as timing of taking the medicine and a dosage of the medicine, and the like on the medicine bag.

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In a conventional medicine bag printing apparatus, medicine bags different in size from each other are produced from medicine bag base paper wound around a medicine bag roll. Then, the medicine bags thus produced are transferred to a printer, and necessary information is printed on each medicine bag by the printer.

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Thereafter, the medicine bags each subjected to the printing process are carried out of the printer (refer to, e.g., JP2000-218873A, JP06-16343U and JP09-168578A). The medicine bags carried out of the printer are sorted for each patient by a sorting device.

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[0003] However, the conventional medicine bag printing apparatus has a problem of poor transfer efficiency because medicine bags each subjected to a printing process are carried out of the printer one by one. In addition, in a case where the medicine bags, which are each subjected to the printing process, are sorted for each patient, since the medicine bags are transferred at random, a sort of the medicine bags for each patient becomes complicated and control thereof also becomes complicated.

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### SUMMARY OF THE INVENTION

[0004] The present invention is made in view of the aforementioned conventional

problems. It is therefore an object of the present invention to provide a medicine bag printing apparatus that will efficiently transfer medicine bags and facilitate a sort of the medicine bags for each patient.

[0005] In order to achieve this object, the present invention provides a medicine bag printing apparatus configured by an apparatus main body comprising: a printing unit including a medicine bag cassette attached thereto/detached therefrom, the medicine bag cassette housing a plurality of medicine bags and supplying the medicine bags one by one, a printing part printing medicine information and an image of a medicine on the medicine bag supplied from the medicine bag cassette, and a tray storing the medicine bags each subjected to the printing process by the printing part such that a tip end of each medicine bag protrudes therefrom; a holding section holding the tip end of the medicine bag placed on the tray of the printing unit; and a carrying section carrying the medicine bag, having the tip end held by the holding section, out of the printing unit.

15 [0006] Preferably, the holding section operates based on a print completion signal indicative of completion of the printing process performed on medicine bags for one patient by the printing part.

[0007] According to the present invention, the printing part of the printing unit sequentially performs a printing process on medicine bags for one patient, and 20 discharges the medicine bags onto the tray. When the tray stores a plurality of medicine bags for one patient, the holding section holds tip ends of the medicine bags protruding from the tray, and the carrying section carries the plurality of medicine bags out of the printing unit at a time. Thus, transfer efficiency is improved and a sort of medicine bags for each patient is readily performed.

25 [0008] Preferably, the printing unit is horizontally pulled out from the apparatus main body in a direction perpendicular to a discharge direction of a medicine bag.

Thus, the printing unit is pulled out from the apparatus main body in order to detach a medicine bag cassette therefrom, so that fill of medicine bags into the medicine bag cassette can be readily performed.

[0009] In this case, preferably, the printing unit is pulled out from the apparatus main body and, then, turns such that the medicine bag cassette is attached thereto/detached therefrom. Thus, attachment/detachment of a medicine bag cassette to/from the printing unit and fill of medicine bags into the medicine bag cassette can be performed more readily.

[0010] Preferably, the medicine bag printing apparatus further comprises: a plurality of medicine bag supply units producing medicine bags different in size from each other from medicine bag base paper wound around medicine bag rolls and, then, supplying the medicine bags thus produced; a plurality of transfer sections transferring the medicine bags supplied from the medicine bag supply units; a plurality of printers printing medicine information on the medicine bags transferred by the transfer sections; and a plurality of carrying sections carrying the medicine bags, each subjected to the printing process by the printers, out of the printers. Thus, it is possible to perform a printing process efficiently by using the plurality of printers and the printing unit.

[0011] Preferably, each of the plurality of medicine bag supply units is horizontally pulled out from the apparatus main body, and includes a locking device locking the printing unit so as to prevent the printing unit from being pulled out from the apparatus main body when one of the plurality of medicine bag supply units is pulled out from the apparatus main body. Thus, it is possible to prevent the apparatus main body from being toppled over due to concurrent pullout of the units from the apparatus main body.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is a front sectional view of a medicine bag printing apparatus according to the present invention.

Fig. 2A is an enlarged front view of a holding section in a retreat position, and Fig. 5 2B is an enlarged front view of the holding section in a hold position.

Fig. 3 is a side view of the medicine bag printing apparatus in a state in which a laser printer is pulled out therefrom.

Fig. 4 is a plan view of the medicine bag printing apparatus in a state in which the laser printer is pulled out therefrom.

Fig. 5 is a plan view of the medicine bag printing apparatus in a state in which the laser printer turns.

Fig. 6 is a control block diagram of a locking device.

Fig. 7 shows one example of print on a medicine bag.

## DETAILED DESCRIPTION OF THE INVENTION

[0013] Hereinafter, description will be given of an embodiment of the present invention with reference to the attached drawings.

[0014] Fig. 1 illustrates a medicine bag printing apparatus according to the present invention. This medicine bag printing apparatus is configured by an apparatus main body 1 including a first medicine bag supply section 2, a second medicine bag supply section 3, a third medicine bag supply section 4, a first inkjet printer 5, a second inkjet printer 6, a third inkjet printer 7 and a laser printer 8. A medicine bag discharge section 9 is provided at a side face of the apparatus main body 1.

[0015] The first medicine bag supply section 2, the second medicine bag supply section 3 and the third medicine bag supply section 4 produce and supply medicine

bags different in size and kind from each other, respectively, but have a single structure. Therefore, description will be given of, as a typical example, the third medicine bag supply section 4 herein. A plurality of medicine bag rolls 11, around which medicine bag sheets 10, each previously folded in two in a longitudinal direction,  
5 are wound and which are different in size from each other, are detachably attached to the third medicine bag supply section 4. A medicine bag supply path 12 extends from these medicine bag rolls 11, and a sealing/cutting device 13 is disposed on the medicine bag supply path 12. The sealing/cutting device 13 seals and cuts the medicine bag sheets 10 that have been unreeled from the medicine bag rolls 11 at a predetermined interval to form a medicine bag 14. For replacement of the medicine  
10 bag roll 11, each of the medicine bag supply sections 2, 3 and 4 can be pulled out from the apparatus main body 1 in a forward direction.

[0016] From the first medicine bag supply section 2, a first medicine bag transfer path 16 extends to the first inkjet printer 5 via a first sorting section 15 and a second medicine bag transfer path 17 extends to the second inkjet printer 6 via the first sorting section 15. Thus, medicine bags 14 to be supplied from the first medicine bag supply section 2 can be supplied to one of the first inkjet printer 5 and the second inkjet printer 6. From the second medicine bag supply section 3, a third medicine bag transfer path 19 extends to the second inkjet printer 6 via a second sorting section  
15 20 and a fourth medicine bag transfer path 20 extends to the third inkjet printer 7 via the second sorting section 18. Thus, medicine bags 14 to be supplied from the second medicine bag supply section 3 can be supplied to one of the second inkjet printer 6 and the third inkjet printer 7. From the third medicine bag supply section 4, a fifth medicine bag transfer path 21 extends to the second sorting section 18. Thus,  
25 medicine bags 14 to be supplied from the third medicine bag supply section 4 can be supplied to one of the second inkjet printer 6 and the third inkjet printer 7.

[0017] Each of the first inkjet printer 5, the second inkjet printer 6 and the third inkjet printer 7 receives prescription information from a control section (not illustrated) and, in accordance with the prescription information, prints medicine information including a name of a patient, a name of a medicine, timing of taking the medicine, effects of the medicine, side-effects of the medicine, and the like on the medicine bags 14 supplied from each of the first medicine bag supply section 2, the second medicine bag supply section 3 and the third medicine bag supply section 4.

[0018] The laser printer 8 corresponds to a printing unit of the present invention, and includes a plurality of (two in this embodiment) medicine bag cassettes 22a and 22b, a printing part 23, and a discharge tray 24. The medicine bag cassettes 22a and 22b are attachable to/detachable from a unit main body 25, house medicine bags 14 that are different in size from each other, respectively, and supply the medicine bags 14 one by one. As in the inkjet printers 5, 6 and 7, the printing part 23 receives prescription information from the control section (not illustrated) and, in accordance with the prescription information, prints medicine information including a name of a patient, a name of a medicine, timing of taking the medicine, effects of the medicine, side-effects of the medicine, and the like on medicine bags 14 supplied from each of the medicine bag cassettes 22a and 22b. Additionally, the printing part 23 can print an image of the medicine. The discharge tray 24 temporarily stores the medicine bag 14 subjected to the printing process by the printing part 23. The discharge tray 24 is provided with a medicine bag support pedestal 26 for supporting the medicine bag 14 in such a manner that a tip end of the medicine bag 14 protrudes from the medicine bag support pedestal 26 in a slanting position. Herein, one of the medicine bag cassettes 22a and 22b or a paper cassette (not illustrated) houses sheets of copy paper, and supplies a sheet of copy paper to the printing part 23. The printing part 23 prints medicine information including a name of a patient, a name of a medicine, an

image of the medicine, timing of taking the medicine, effects of the medicine, side-effects of the medicine, and the like on the sheet of copy paper. This sheet of copy paper subjected to the printing process is inserted into a medicine bag subjected to the printing process by the aforementioned inkjet printer.

5 [0019] As illustrated in Fig. 3, the laser printer 8 is mounted on a rotary stage 28 provided on a table 27, and the table 27 can be horizontally pulled out from the apparatus main body 1 in a direction perpendicular to a discharge direction of a medicine bag 14. The table 27 is provided with a locking device 29 for preventing the table 27 from being pulled out from the apparatus main body 1, a switch 30 for  
10 releasing a lock state, and a sensor 31 for detecting whether or not the table 27 is pulled out from the apparatus main body 1. The locking device 29 includes a locking pin 33 engaged with/disengaged from a locking hole 32 provided on the table 27, and a solenoid 34 for driving the locking pin 33, but is not limited to this configuration. Similarly, the medicine bag supply sections 2, 3 and 4 are provided with locking  
15 devices 29a, 29b and 29c each preventing pullout from the apparatus main body 1, lock release switches 30a, 30b and 30c, and sensors 31a, 31b and 31c, respectively. These components are controlled by a control device 35 as illustrated in Fig. 6.

[0020] From the first inkjet printer 5, the second inkjet printer 6, the third inkjet printer 7 and the laser printer 8, a first medicine bag discharge path 36, a second medicine bag discharge path 37, a third medicine bag discharge path 38 and a fourth medicine bag discharge path 39 extend to the medicine bag discharge section 9, respectively. A holding section 40 of the present invention is provided on an upstream side-end of the fourth medicine bag discharge path 39. As illustrated in the figure, the holding section 40 includes a conveyor part 41 and a pressing roller part 42. The conveyor part 41 is arranged in the vicinity of the medicine bag support pedestal 26 of the laser printer 8 and below a tip end of a medicine bag 14 supported  
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by the medicine bag support pedestal 26. The pressing roller part 42 is provided above the conveyor part 41 so as to turn about a shaft 43, and has a roller 44 at its tip end. Thus, the pressing roller part 42 is shiftable between a retreat position at which the roller 44 is spaced away from the conveyor part 41 and a hold position at which 5 the roller 44 approaches the conveyor part 41 so as to nip a tip end of a medicine bag 14 placed on the conveyor part 41.

[0021] The discharge section 9 includes a medicine bag common transfer path 45 and a medicine bag extraction tray 46. The medicine bag common transfer path 45 changes the orientation of medicine bags 14 that are discharged horizontally from 10 each of the first medicine bag discharge path 36, the second medicine bag discharge path 37, the third medicine bag discharge path 38 and the fourth medicine bag discharge path 39 and, then, transfers the medicine bags 14 downward. The medicine bag extraction tray 46 is provided below the medicine bag common transfer path 45, and stores medicine bags 14 transferred from the medicine bag common 15 transfer path 45 in a state in which the medicine bags 14 are sorted for each patient by a sorting plate 47.

[0022] Next, description will be given of an operation of the medicine bag printing apparatus configured as described above.

[0023] When an operator inputs prescription information to the medicine bag 20 printing apparatus or a host computer (not illustrated) transmits prescription information to the medicine bag printing apparatus, the medicine bag printing apparatus selects a size of a medicine bag based on a kind and a quantity of a medicine to be prepared, and designates one of the medicine bag supply sections 2, 3, 4 and medicine bag cassettes 22a, 22b of the laser printer 8, for supplying medicine 25 bags of the selected size.

[0024] In the designated medicine bag supply section, e.g., the third medicine bag

supply section 4, the medicine bag sheet 10 is unreeled from the medicine bag roll 11, passes through the medicine bag supply path 12 and is sealed and cut by the sealing/cutting device 13 at a predetermined interval; thus, medicine bags 14 are produced. Then, each of the produced medicine bags 14 passes through one of the  
5 transfer paths via the second sorting section 18, and is transferred to one of the inkjet printers, e.g., the third inkjet printer 7 on standby. As illustrated in the figure, the third inkjet printer 7 prints medicine information including a name of a patient, a name of a medicine, timing of taking the medicine, effects of the medicine, side-effects of the medicine, and the like on the medicine bags 14 in accordance with the  
10 prescription information. The medicine bags 14, which are each subjected to the printing process, pass through the third medicine bag discharge path 38, and reach the sorting plate 47 via the medicine bag common transfer path 45 of the medicine bag discharge section 9. The medicine bags 14 are sorted for each patient by the sorting plate 47 and, then, are discharged onto the medicine bag extraction tray 46.

15 [0025] If the medicine bag printing apparatus designates the laser printer 8, one of the medicine bag cassettes 22a and 22b, housing medicine bags of a required size, supplies medicine bags 14 to the printing part 23. As illustrated in the figure, the printing part 23 prints medicine information including a name of a patient, a name of a medicine, an image of the medicine, timing of taking the medicine, effects of the  
20 medicine, side-effects of the medicine, and the like on the medicine bags 14 in accordance with the prescription information. The medicine bags 14, which are each subjected to the printing process, are placed on the medicine bag support pedestal 26 of the discharge tray 24. If one specific patient needs a plurality of medicine bags 14, the medicine bags 14 are stacked on the discharge tray 24 until all of them are  
25 discharged. Each medicine bag 14 is stacked on the discharge tray 24 such that a tip end thereof protrudes from the medicine bag support pedestal 26 and is supported by

the conveyor part 42 of the holding section 40. After completion of the printing process performed on all medicine bags 14 for one patient, the laser printer 8 outputs a print completion signal to the holding section 40. As a result, the pressing roller part 42 of the holding section 40 shifts to the hold position based on the print completion signal to hold all of the medicine bags for one patient. Thus, the medicine bags 14 placed on the medicine bag support pedestal 26 pass through the fourth medicine bag discharge path 39, and reach the sorting plate 47 via the medicine bag common transfer path 45 of the medicine bag discharge section 9. The medicine bags 14 are sorted for each patient by the sorting plate 47 and, then, are discharged onto the medicine bag extraction tray 46. Herein, the medicine bags 14 for one patient are discharged in a lump; therefore, there is no necessity to actuate the sorting plate 47.

10 [0026] In a case where the medicine bag cassettes 22a and 22b of the laser printer 8 become empty of medicine bags 14, the operator flicks the lock release switch 30, pulls out the table 27 of the laser printer 8 from the apparatus main body 1 as illustrated in the figure, and turns the laser printer 8 on the rotary stage 28 at 90° so as to face an attachment/detachment side of each of the medicine bag cassettes 22a and 22b. Thus, the operator can detach the medicine bag cassettes 22a and 22b from the laser printer 8 to thereby fill the medicine bag cassettes 22a and 22b with medicine bags 14.

15 [0027] In addition to the laser printer 8, similarly, each of the medicine bag supply sections 2, 3 and 4 can be pulled out from the apparatus main body 1. Therefore, when one of the medicine bag supply sections 2, 3 and 4 is pulled out from the apparatus main body 1, the laser printer 8 is prevented from being pulled out from the apparatus main body 1 in order to prevent the apparatus main body 1 from being 20 toppled over. More specifically, in the control device 35 illustrated in Fig. 6, when the lock release switch 30 of the laser printer 8 is flicked, the sensor 31 detects whether or 25

not one of the medicine bag supply sections 2, 3 and 4 is pulled out from the apparatus main body 1. If it is determined herein that none of the medicine bag supply sections 2, 3 and 4 is pulled out from the apparatus main body 1, the locking device 29 of the laser printer 8 is released. Thus, the laser printer 8 can be pulled out from the apparatus main body 1. On the other hand, if it is determined herein that one of the medicine bag supply sections 2, 3 and 4 is pulled out from the apparatus main body 1, the locking device 29 of the laser printer 8 is not released. Thus, the laser printer 8 can not be pulled out from the apparatus main body 1, so that the apparatus main body 1 is prevented from being toppled over.